We claim:

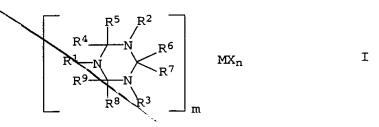
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A process for copolymerizing ethylene or propylene together or with other olefinically unsaturated compounds, which comprises carrying out the polymerization in the presence of a catalyst system which comprises the following components:

- A) a complex of a transition metal with one or two substituted or unsubstituted 1,3,5-triazacyclohexane ligands or corresponding ligands in which one or more of the ring nitrogen atoms are replaced by phosphorus or arsenic atoms, and
- 15 B) if desired one or more activator compounds.
- A process for copolymerizing ethylene or propylene together or with other olefinically unsaturated compounds at temperatures from 20 to 300°C under pressures from 5 to 4000 bar, which comprises the following steps:
  - a) contacting a complex of a transition metal with one or two substituted or unsubstituted 1,3,5-triazacyclohexane ligands (A) with at least one activator compound (B),
  - b) contacting the reaction product from step (a) with the olefinically unsaturated compounds under polymerization conditions.
  - 3. A process as claimed in claim 1 or 2, wherein a compound of the formula I

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- in which the variables have the following meanings:
  - M a transition metal of groups 4 to 12 of the periodic table.
- 45  $R^{1}-R^{9}$  hydrogen or organosilicon or -carbon substituents with 1 to 30 C atoms, it being possible for two geminal or vicinal  $R^{1}$  to  $R^{9}$  radicals also to be connected to form a

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five- or six-membered ring, and it being possible, when m is 2, for an  $R^1-R^9$  radical of in each case one triazacyclohexane ring to form together with a substituent on the other triazacyclohexane ring a bridge between the two rings,

fluorine, chlorine, bromine, iodine, hydrogen,  $C_1-C_{10}$ -alkyl,  $C_6-C_{15}$ -aryl or alkylaryl with 1 to 10 C atoms in the alkyl radical and 6 to 20 C atoms in the aryl radical, trifluoroacetate,  $BF_4^-$ ,  $PF_6^-$ , or bulky noncoordinating anions,

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m 1 or  $\sqrt{2}$ ,

n a number from 1 to 4 which corresponds to the oxidation state of the transition metal M

is employed as component (A).

- 20 4. A process as claimed in any of claims 1 to 3, wherein M is a transition metal of group 6 of the periodic table.
- 5. A process as claimed in any of claims 1 to 4, wherein mixtures of ethylene with  $C_3-C_8-\alpha$ -olefins are employed as monomers.
  - 6. A process as claimed in any of claims 1 to 5, wherein an aluminoxane is employed as activator compound (B).
- 30 7. A process as claimed in any of claims 1 to 5, wherein a borane or borate having at least 2 substituted aryl radicals is employed as activator compound (B).
- 8. A process as claimed in any of claims 3 to 7, wherein at least one of the radicals R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> is different from the other radicals in this group.
- A catalyst for polymerizing olefins, comprising at least one transition metal complex (A) as defined in claims 1 to 4, or
  8 and a support material and, if desired one or more activator compounds (B).
- 10. A process for polymerizing or copolymerizing olefins wherein the polymerization or copolymerization is carried out in the presence of a catalyst as claimed in claim 9.

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A transition metal complex of the formula I as defined in claim 3, wherein at least one of the radicals  $R^1$ ,  $R^2$  and  $R^3$  is different from the other radicals in this group.

5 12. A transition metal complex of the formula I as defined in claim 3, wherein m is 2 and one radical R<sup>1</sup>-R<sup>9</sup> of one triazacyclohexane ring together with one of these substituents of the other triazacyclohexane ring forms a bridge between the two rings.

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13. The use of a complex of a transition metal as defined in any of claims 1 to 4, 11 or 12 in the copolymerization of ethylene or propylene together or with other olefinically unsaturated compounds.

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